

**DEPARTMENT OF TRANSPORTATION****DIVISION OF ENGINEERING SERVICES**

Office of Structural Materials

Quality Assurance and Source Inspection



Bay Area Branch

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Contract #: 04-0120F4Cty: SF/ALA Rte: 80 PM: 13.2/13.9File #: 69.28**WELDING INSPECTION REPORT****Resident Engineer:** Pursell, Gary**Address:** 333 Burma Road**City:** Oakland, CA 94607**Report No:** WIR-004337**Date Inspected:** 28-Oct-2008**Project Name:** SAS Superstructure**OSM Arrival Time:** 1400**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 2300**Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island **Location:** Shanghai China**CWI Name:** Zhu Zhong Hai**CWI Present:** Yes No**Inspected CWI report:** Yes No N/A**Rod Oven in Use:** Yes No N/A**Electrode to specification:** Yes No N/A**Weld Procedures Followed:** Yes No N/A**Qualified Welders:** Yes No N/A**Verified Joint Fit-up:** Yes No N/A**Approved Drawings:** Yes No N/A**Approved WPS:** Yes No N/A**Delayed / Cancelled:** Yes No N/A**Bridge No:** 34-0006**Component:** Tower**Summary of Items Observed:**

Caltrans QA Inspector observed that ZPMC had performed the welding of fit-lug to stiffener plate on 2 welds these welds were identified as MUB-MA21-A/J-62 and MUB-MA21-A/J-23. Upon the arrival of this QA inspector it was observed that ZPMC had completed the welding of both fit-lug to stiffener except for weld 62 that was determined to need one more weld pass to achieve the 22 mm size fillet weld. It was noted that ZPMC was using the Flux Cored Arc Welding (FCAW) process for these two welds as outlined in WPS-B-T-2231 with electrode E71T-1, 1.4mm diameter wire. The additional information was obtained by ZPMC QC (CAWI) inspector onsite Zhang Huang who is assisting the ZPMC CWI Zhu Zhong Hai. For weld number MUB-MA21-A/J-62 the multi-pass fillet weld received a total of 5 weld passes to achieve the 22mm weld size. During the welding operation the fit-lug that was "dogged" in place has moved to create an approximate 3mm gap which is within the tolerance of the new WPS, ABF-WPS-D15-F1202A for high nickel. The welding parameters obtained were 207 amps, 25.3 volts and travel speed of 113mm/min, the preheat temperature was 198°C prior to welding with welder Liu Xiaolin # 067079. Weld number MUB-MA21-A/J-23 the multi-pass fillet weld received a total of 4 weld passes to achieve the 22mm weld size. During the welding operation the fit-lug that was "dogged" in place has moved to create an approximate 7mm gap which is not within the 5mm tolerance as outlined in the new WPS, ABF-WPS-D15-F1202A for high nickel. ZPMC QC personnel Ken Zhang stated that ZPMC will wait for the weld to cool down and check the gap again and if there is no change, ZPMC will determine how to bring the gap within tolerance. The welding parameters obtained were 213 amps, 25.5 volts and travel speed of 116mm/min, the preheat temperature was 203°C prior to welding with welder Wen Yangyan # 066734. The time ZPMC completed welding was 1520 hrs and a temperature of 210°C for the start of the controlled cool down process with ZPMC checking the temperatures every 15min and recording them every 30min. below is the cool down rate tracking being performed.

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1520 hrs – 210°C (Start of cool down)  
1550 hrs – 203°C (7°C drop in 1/2 hour)  
1620 hrs – 190°C (20°C drop in 1 hour)  
1650 hrs – 177°C (26°C drop in 1 hour)  
1720 hrs – 159°C (31°C drop in 1 hour)  
1750 hrs - 151°C (26°C drop in 1 hour)  
1820 hrs – 126°C (33°C drop in 1 hour)  
1850 hrs – 108°C (43°C drop in 1 hour)  
1920 hrs – 90°C (36°C drop in 1 hour)  
1950 hrs - 72°C (36°C drop in 1 hour)  
2020 hrs – 63°C (27°C drop in 1 hour)

Ambient temperature needed to be reached to fulfill procedure as established with ABF is 26°C.

During the controlled cool down after the completion of welding ZPMC and ABF was monitoring the cool down rate as observed by this Caltrans QA Inspector. During the odd hour of 1750 hrs to 1950 hrs it was determined that the cool down rate exceeded the maximum allowable temperature of 40°C per hour as outlined in submittal SUB101R2 by 3°C.

ZPMC informed this Caltrans QA inspector that tomorrow 10/29/08 they will weld the fit-lug to diaphragm fillet welds with the new trial procedure ABF-WPS-D15-F1202A for the Shielded Metal Arc Welding (SMAW) process.

The welding electrode will be E7018-C3L, 3.2mm diameter. At this time there is no PQR to back up this WPS; Caltrans was informed that if this weld trial passes ABF and ZPMC will run the PQR for this WPS. Also noted on the new WPS is the root gap tolerance which states for plates and shapes less than 75mm the root gap shall not be greater than 5mm. If the root gap is greater than 2mm that weld size shall be increased the same amount as the root gap up to 5mm. Example 4mm root gap the weld size for a 22mm fillet weld will be increased to 24mm (+2mm). This QA Inspector was also informed by ABF that after the welding of the diaphragm to fit lug with the SMAW high nickel electrode tomorrow 10-29-08, that if these welds pass with no cracking or controlled heat cool down problems they will continue at this same location with 2 more trials to achieve 3 consecutive acceptable results. Tower Shop Bay 3 Deck Panel repairs

The QA Inspector randomly observed ZPMC personnel performing grinding of repairs for the Orthotropic Box Girder (OBG) deck panel Partial Joint Penetration (PJP) welds. This QA inspector along with ZPMC and ABF personnel performed the 3 party final visual inspections. All 3 parties agreed that the repaired areas were completed and signed the yellow ABF tracking tag affixed to the deck panel. The deck panels inspected were DP380-001 and DP541-001. Deck panel DP460-001 which Caltrans QA was informed to be ready for final inspection was not completed as ZPMC was grinding and welding at repair areas marked by ZPMC's CWI Chen Xi. This QA Inspector was informed that this deck panel would be ready for final VT tomorrow morning on the day shift 10/29/0. Certified Welding Inspector for ZPMC Li Yan Hua (dayshift) and Chen Xi (night shift) were present at this location for the monitoring of the deck repairs and inspection. Also noted in bay 3 to monitor deck panel repairs were ABF personnel Wang Wei.

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### Summary of Conversations:

As noted above.

### Comments

This report is for the purpose of determining conformance with the contract documents and is not for the purpose of making repair or fit for purpose recommendations. Should you require recommendations concerning repairs or remedial efforts please contact Josh Ishibashi, 1-376-471-0411, who represents the Office of Structural Materials for your project.

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<b>Inspected By:</b>	Riley, Ken	Quality Assurance Inspector
<b>Reviewed By:</b>	Carreon, Albert	QA Reviewer

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